Uniform Type Identifiers and Launch Services

Session 107

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Application Technologies

Uniform Type Identifiers and Launch Services

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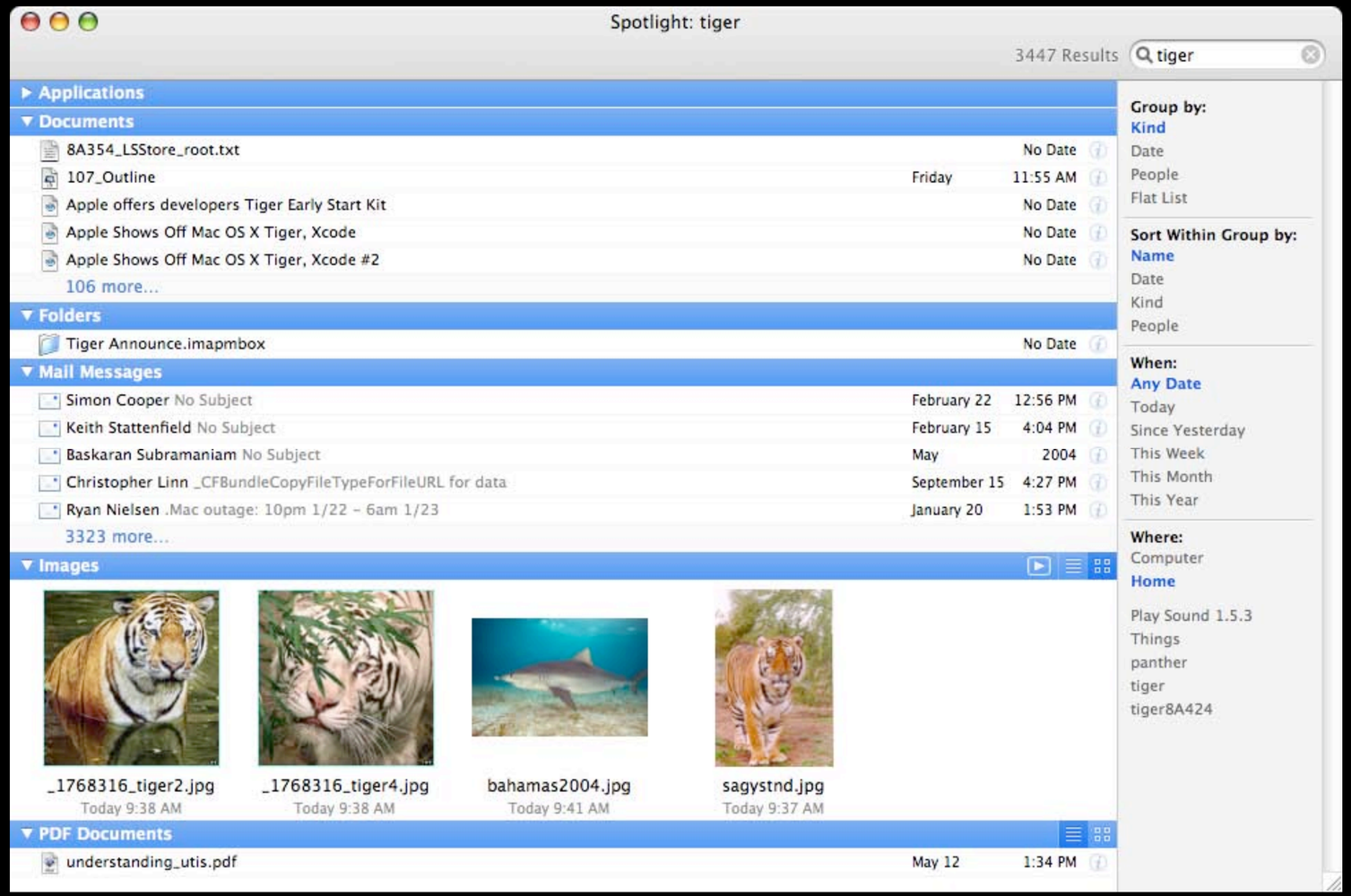
http://developer.apple.com/wwdc2005/

Overview

- Introduction
  - Why are you here?
- Part I—Design
  - What is type identification?
  - How are types represented?
  - How are types organized?
- Part II—Practice
  - How do you use this stuff?

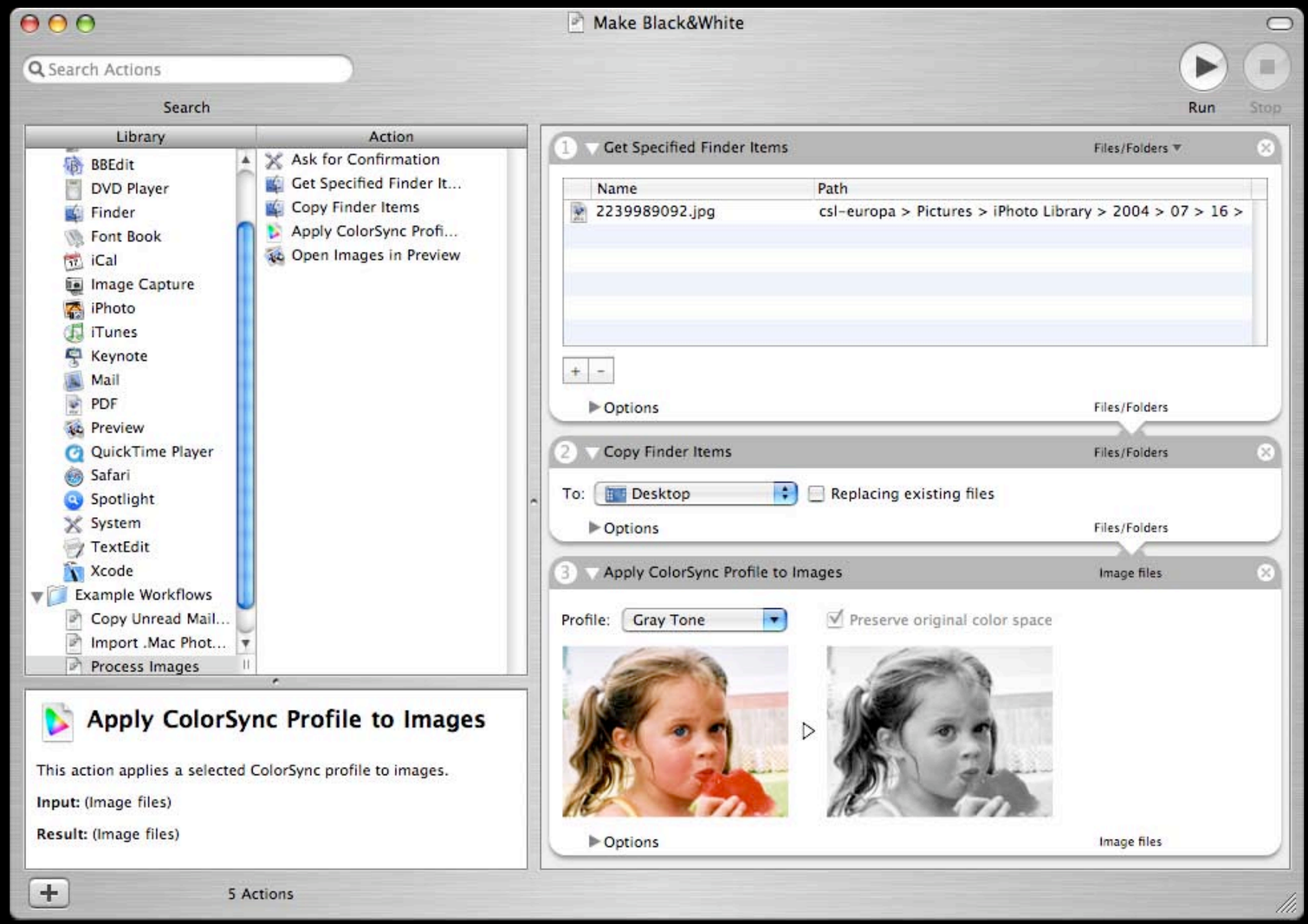
Why Are You Here?

Spotlight



Why Are You Here?

Automator



Why Are You Here?

- Core Image
  - Image Data I/O
- Carbon API
  - Pasteboard and Drag
  - Translation Services
  - Navigation Services
- Launch Services
  - Simplified Application Document Types
  - Binding Preferences
  - Drag and Drop Service Invocation

Technology Map

Finder

Mail

Automator

Your App

Spotlight

Carbon

Core Image

Launch Services

Uniform Type Identifiers

Part I—Design

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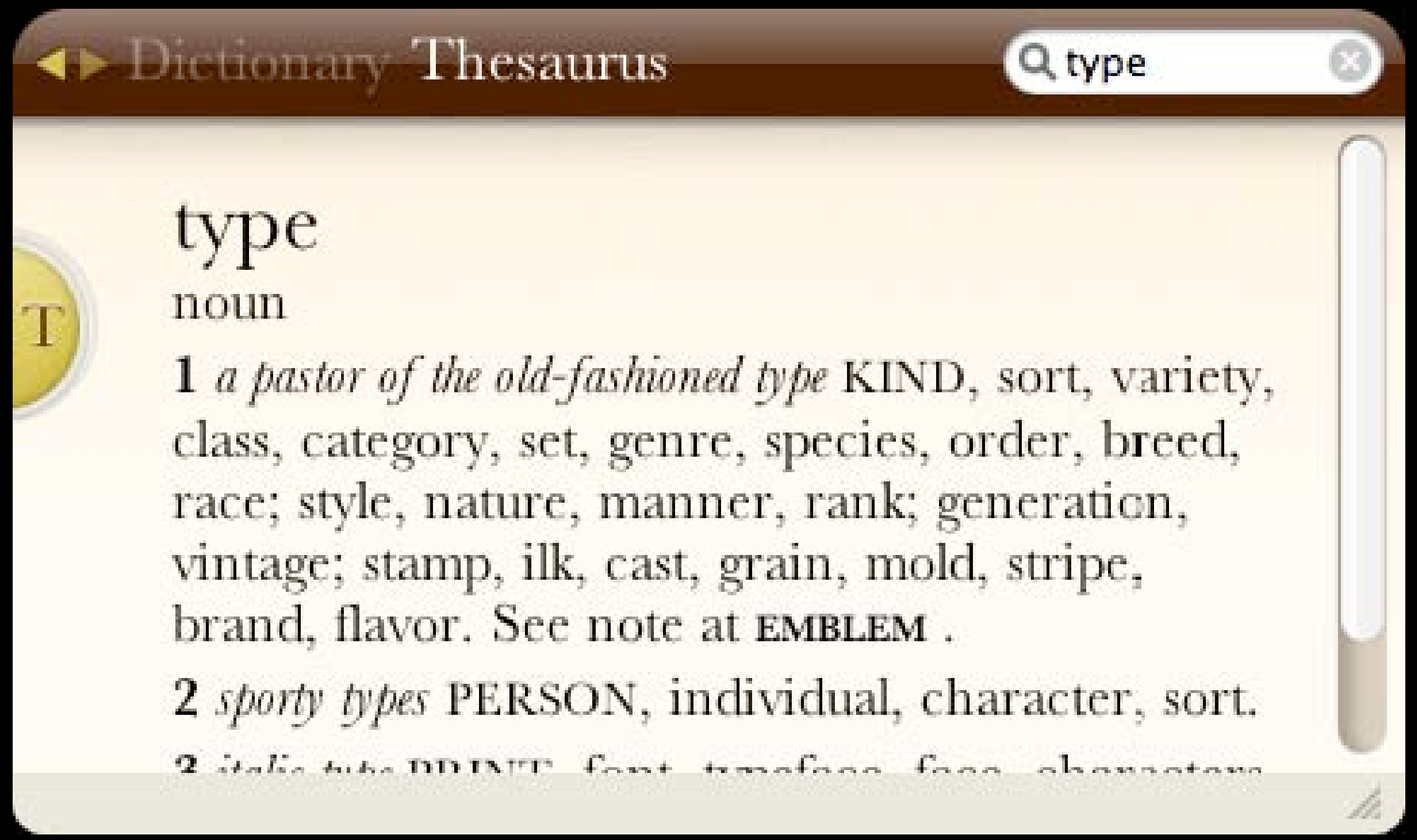
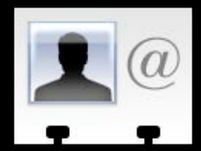
What Is Type Identification?



What Kinds of Things?

Pasteboard

Files



People

Your Application

Folders

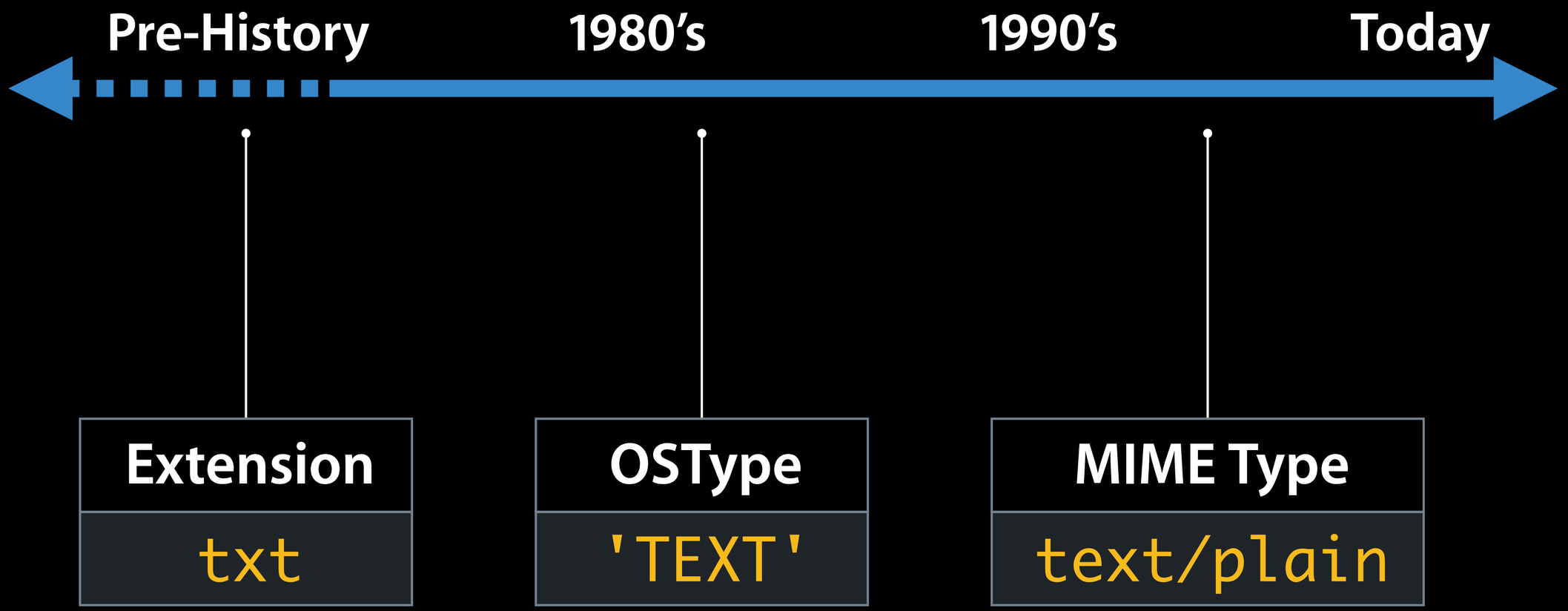
Email

Volumes

Events

Internet

Type Identifiers Through the Ages



Uniform Type Identifiers

- Reverse DNS naming convention prevents collisions
- Freely extensible by Apple and developers—no bureaucracy
- Verbose names are easy to understand
- The `public` domain is reserved by Apple for standard types

`public.text`

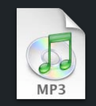
`com.apple.application`

`public.c-plus-plus-source`

How Are Types Represented?

How Are Types Represented?

`public.mp3`

Description:	MP3 audio
Icon:	
Extension:	`mp3`
MIME Types:	`audio/mpeg` `audio/mp3`
OSTypes:	`'MPG3'` `'MP3 '`

Type Conformance

public.content

public.audiovisual-content

public.audio

public.mp3

Description:	MP3 audio

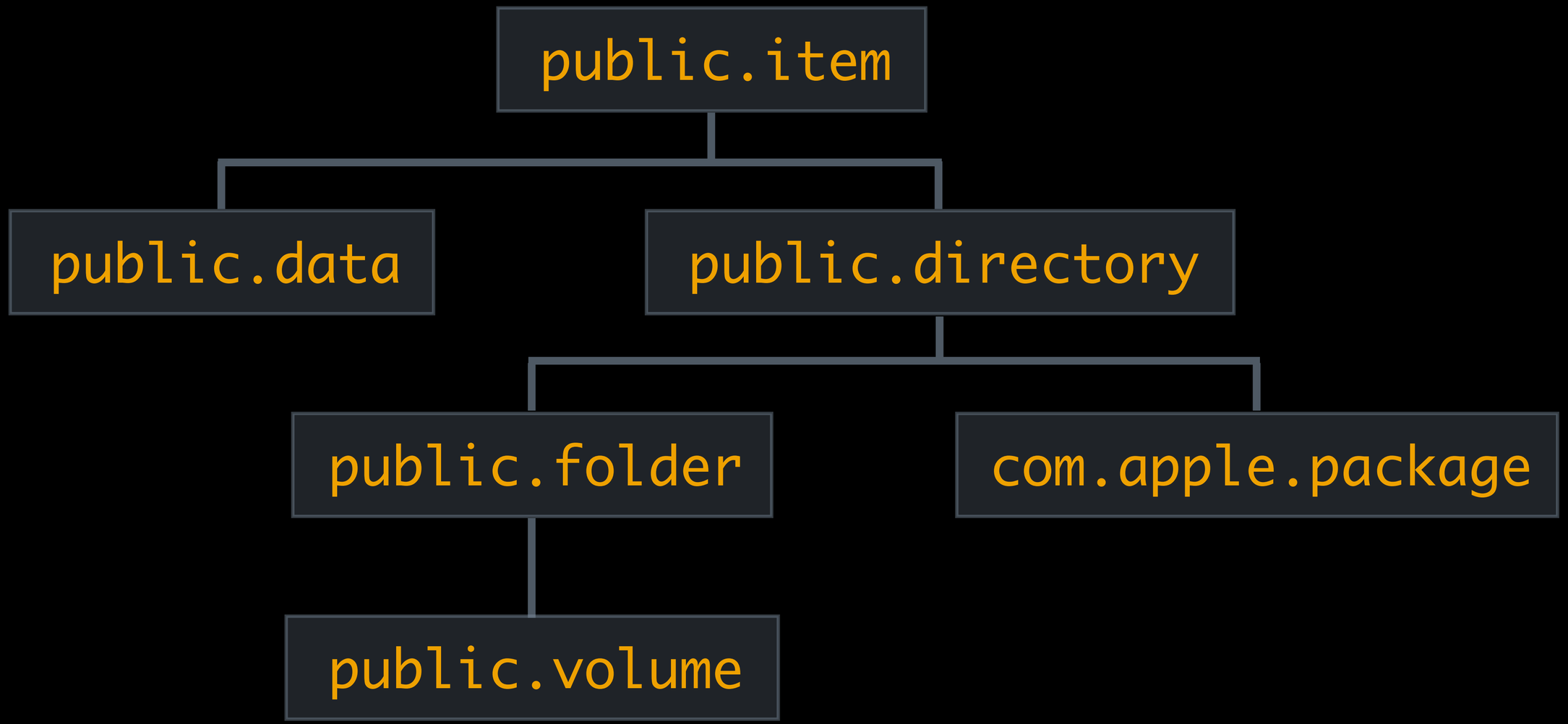
How Are Types Organized?

How Are Types Organized?

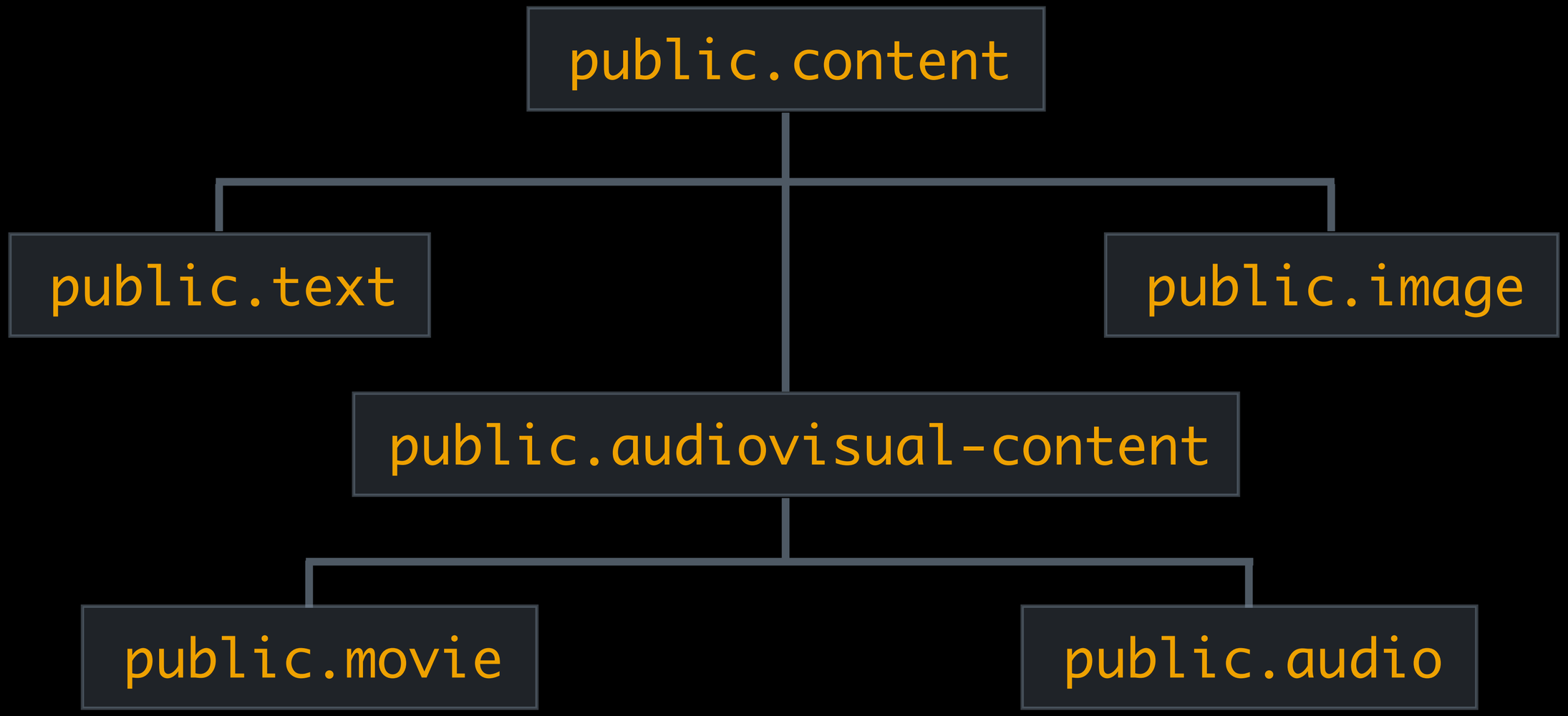
Multiple Hierarchies

- Physical hierarchy
  - Low-level, technical view
- Functional hierarchy
  - High-level, user view
- Every type has a place in both hierarchies

The Physical Hierarchy



The Functional Hierarchy



The Functional Hierarchy

public.content

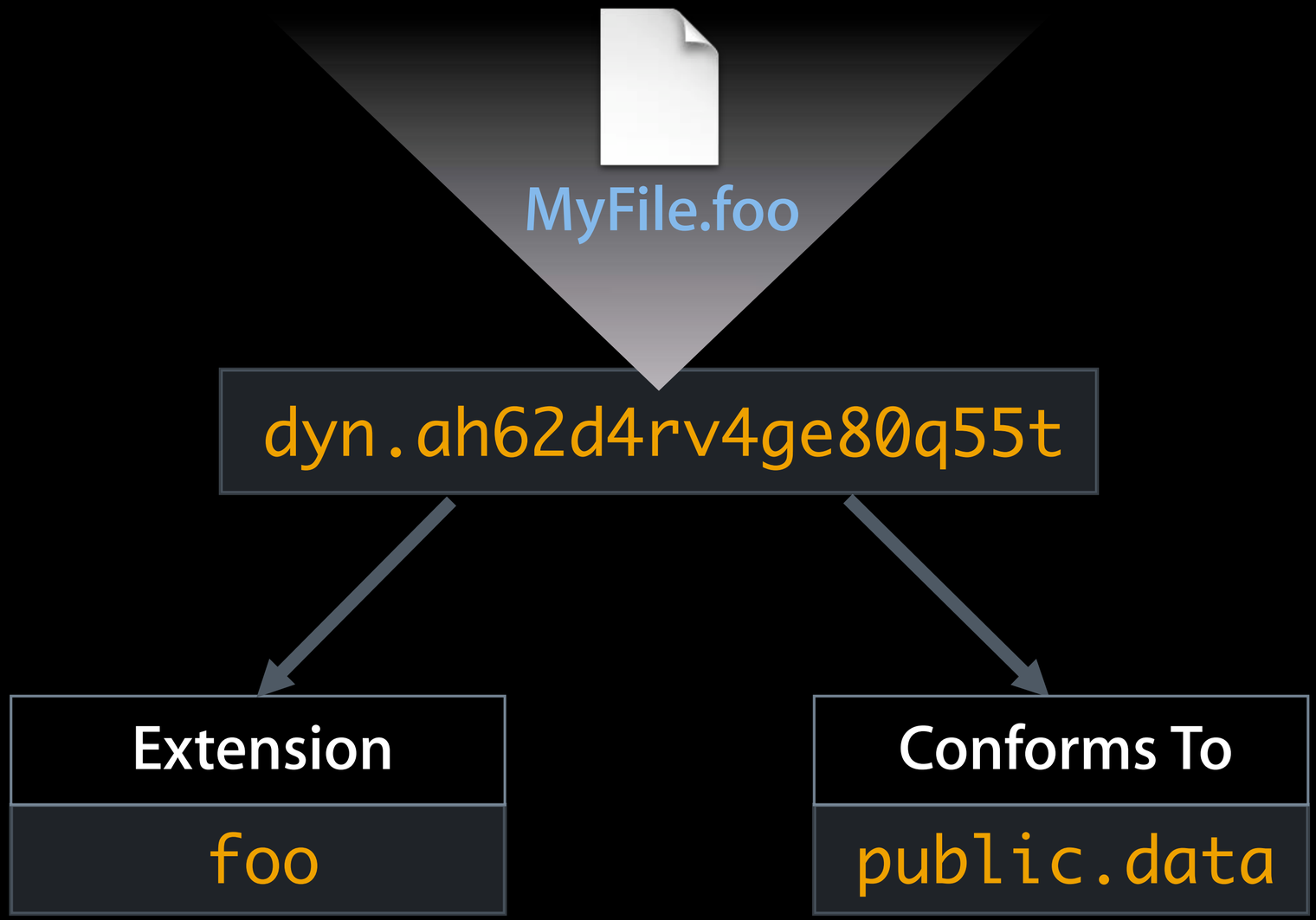
public.message

public.calendar-event

public.contact

public.archive

Dynamic Type Identifiers



Part II—Practice

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Two Key Usage Patterns

- Work with existing types to
  - Adopt new carbon APIs (pasteboard, translation, navigation)
  - Simplify file system interaction
  - Display Spotlight search results
- Declare new types for better Tiger integration
  - Writing a Spotlight importer
  - Creating an Automator action plugin

Working With Existing Types

- Over 150 type declarations are built-in to Mac OS X Tiger
- Abstract types structure the hierarchy
- Concrete types for many standard or common data and document formats
- See string constants in header `UTCoreTypes.h`

```
/*  kUTTypeJPEG
 *
 *    JPEG image
 *
 *    UTI: public.jpeg
 *    conforms to: public.image
 */
extern const CFStringRef kUTTypeJPEG;
```

Core API

- Conformance test
- Convert between UTI and “type tags”—MIME, extenison, etc.
- Fetch type attributes
- See header UTType.h

```
Boolean conforms;
CFStringRef extension, description;

conforms = UTTypeConformsTo( myFileUTI, kUTTypeImage );

extension = UTTypeCopyPreferredTagWithClass( kUTTypeJPEG,
              kUTTagClassExtension );

description = UTTypeCopyDescription( kUTTypeHTML );
```

Launch Services Named Attributes

- Fetch one or many attributes for any file system object
- Key attributes
  - Content Type (UTI)
  - Display Name
  - Kind String

```
CFStringRef contentTypeUTI;

OSStatus err = LSCopyItemAttribute(
                    &fileFSRef,
                    kLSRolesAll,
                    kLSItemContentType,
                    &contentTypeUTI );
```

UTIs and Document Type Claims

- Simplify your Info.plist
- Take advantage of type conformance
- No more wild-card claims

```
<key>CFBundleDocumentTypes</key>
<array>
    <dict>
        <key>LSItemContentTypes</key>
        <array>
            <string>public.data</string>
        </array>
        <key>CFBundleTypeRole</key>
        <string>Viewer</string>
    </dict>
</array>
```

Demo

Leveraging UTIs in SimpleText

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Declaring New Types

- Types are declared in your bundle's Info.plist file
  - Applications
  - Spotlight importers
  - Automator action bundles
- Types you own are "exported"
- Types you depend on are "imported"
  - Exception: system-declared types
- Description and icon are loaded from bundle resources

Example Type Declaration

```
<key>UTExportedTypeDeclarations</key>
<array>
    <dict>
        <key>UTTypeIdentifier</key>
        <string>com.mycompany.myimageformat</string>
        <key>UTTypeConformsTo</key>
        <string>public.image</string>
        <key>UTTypeDescription</key>
        <string>My Image</string>
        <key>UTTypeTagSpecification</key>
        <dict>
            <key>public.filename-extension</key>
            <string>myimage</string>
            </array>
            <key>public.mime-type</key>
            <string>image/x-myimageformat</string>
        </dict>
    </dict>
```

Registering With Launch Services

- Register your bundle with Launch Services to activate
  - Bundle Identifier and icon
  - Document bindings
  - Type declarations
- Register applications by browsing, copying, or launching
- Register importers and actions by dragging install
  - Library/Spotlight
  - Library/Automator
- Installers can also call any variant of `LSRegister()`
- Touch mod date when editing Info.plist in place!

The Launch Services Database

- Database file paths: /Library/Caches/com.apple.LaunchServices*
- Each user has a separate database (new for Tiger)
- Debug your Info.plist using the lsregister tool

```
% find /System/Library/Frameworks -name lsregister

% lsregister -dump

% lsregister -kill -seed

% lsregister -f <path>
```

New Launch Services API

- Named attributes for file system items
- New `LSOpen()` functions
  - Replacement for `LaunchApplication()`
  - Returns process serial number(s)
- New user binding preferences functions to “get” and “set”
  - Document type handlers (UTI-based)
  - URL scheme handlers
  - Replacement for Internet Config
- Helpful headers: LSOpen.h, LSInfo.h

Drag and Drop Service Invocation

- Drag almost anything to application icons in the dock
  - Documents (of course)
  - URL text
  - Data selection handled by a send only service in target application
- Full visual feedback provided by the dock
- Upon drop, service is invoked in the target application

Demo

Drag and Drop Service Invocation

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Behind the Scenes Details…

- A new Apple Event
  - The `kAEOpenContents` event—`'ocon'`
  - Direct object is a list of data items to open
- How to handle the data
  - Open it in a new untitled window
  - Perform some other command using the data
- Steps for adoption
  - Advertise content services in your Info.plist (NSServices)
  - Default `'ocon'` system handler will invoke your service
  - Override the default handler if you wish

Summary—Your Action Items

- Use uniform type identifiers
  - Simplify your code
  - Improve user experience
- Declare new UTIs to integrate with key Tiger features
- Consider new Launch Services APIs
  - Access file system item named attributes
  - Control document and URL binding preferences
  - Open documents, URLs, and applications with new options
- Adopt enhanced drag and drop support in the dock

Documentation, Sample Code, and Other Resources

http://developer.apple.com/wwdc2005/

Q&A

Mark Malone

http://developer.apple.com/wwdc2005/

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